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Cat codes with optimal decoherence suppression for a lossy bosonic channel LINSHU LI, CHANG-LING ZOU, VICTOR V. ALBERT, SREERAMAN MURALIDHARAN, STEVEN GIRVIN, LIANG JIANG, Yale University — We investigate cat codes that can correct multiple excitation losses and identify two types of logical errors: bit-flip errors due to excessive excitation loss and dephasing errors due to quantum back-action from the environment [1]. We show that selected choices of logical subspace and coherent amplitude can efficiently reduce dephasing errors. The trade-off between the two major errors enables optimized performance of cat codes in terms of minimized decoherence. With high coupling efficiency, we show that one-way quantum repeaters with cat codes feature drastically boosted secure communication rate per mode compared with conventional encoding schemes, and thus showcase the promising potential of quantum information processing with continuous variable quantum codes. [1] Li, L. et al. arXiv: 1609.06386

Linshu Li
Yale University

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